



## PATENT ABSTRACTS OF JAPAN

(11) Publication number: **2001118987 A**(43) Date of publication of application: **27.04.01**

(51) Int. Cl. **H01L 25/07**  
**H01L 25/18**

(21) Application number: **11297876**(71) Applicant: **NISSAN MOTOR CO LTD**(22) Date of filing: **20.10.99**(72) Inventor: **NARUSE MIKIO****(54) POWER SEMICONDUCTOR MODULE****(57) Abstract:**

**PROBLEM TO BE SOLVED:** To improve the heat resistant stress characteristics of a power semiconductor module.

**SOLUTION:** In a power semiconductor module, a plurality of power semiconductor elements 1a and 1b are joined to one insulating substrate 4, and the insulating substrate 4 is joined/laminated to a base plate 7. A groove 11 for dividing the insulating substrate 4 into plural substrates is formed in the insulating substrate 4. At least one power semiconductor element (1a or 1b) is arranged in the insulating substrate 4, divided by the groove 11. Even if the thermal stress of a junction part with the enlargement of the junction area of the insulating substrate and the base plate becomes large with the junction of the plural power semiconductor elements to one insulating substrate for reducing assembly man-hours and the trouble of parts management, the insulating substrate is cracked and the insulating substrate is separated at the part of the groove or a through hole string before a crack occurs in the junction part or a joined member is peeled through thermal stress.

Thus, a junction area per insulating substrate becomes small and thermal stress becomes small. Thus, the occurrence of the crack and peeling can be prevented, the heat radiation characteristic of the power semiconductor element is maintained, and heat destruction can be prevented.

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